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UPON THE

# MINERAL RESOURCES

OF THE

# Illinois Central Railroad;

MADE AT THE REQUEST OF THE PRESIDENT,

BY J. W. FOSTER.

MARCH 4th, 1856.

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# REPORT.

To Wm. H. Osborn, Esq., *President of the Illinois Central Railroad Company :—*

Sir:—At your request I have traversed the greater portion of the country contiguous to the Illinois Central railroad and the Chicago branch, with a view of collecting information with regard to the economic geology of the region. These examinations have been made hastily, at an inclement season of the year, and under circumstances which precluded detailed explorations.

In passing over this road, I have been struck with the magnitude of the enterprise; the skill, and rapidity with which it has been constructed; and the variety and extent of the resources which it is destined to develope. Stretching with its main trunk and branches for more than seven hundred miles, through a region of unexampled fertility, and rich in mineral products, with one terminus at Chicago,—already the grain market of the United States,—and the other at Cairo, which, dyked about as it is, must become the key to the traffic of the upper tributaries of the Mississippi, it requires no far-seeing sagacity to appreciate the value of this work, and its importance as a connecting link between the commerce of the two great valleys of North America.

with timber, and occasional isolated clump known in the language of the country as gr the plains are clothed with a luxuriant grow grass. The Chicago branch, so far as com miles in length—runs through the Grand Pr with the exception of two or three groves a mi in width, presents an almost interminable plain natural product is prairie grass. Here the i the ocean becomes more striking. The tim semble wooded shores, while the clumps may islands rising up from a wide expanse of wavi

The country everywhere exhibits traces of wide spread denudation, which first abraded t then covered them with transported materials in places of two hundred feet.

These superficial materials consist of yell blue clay, the latter always subordinate, sand rudely stratified, with occasional boulders of g blende, gneiss, and syenite, reposing upon the

the soil is a light yellow loam. These distinctive differences are well understood by every settler, and the term "prairie soil" to him conveys a precise meaning. It is a popular but mistaken belief that this region was once densely covered with trees, and that their disappearance is to be ascribed to the annual fires that swept over it long before it became known to the whites, consuming every form of vegetation, except where it was protected by the streams and ravines. There is no evidence that, in the previous physical history of this region, the arboreal vegetation was more extended than it is now. The prairies result from the character of the soil, and their origin is no more of a mystery than that of the steppes of Northern Asia, the pampas of Brazil, or the llanos of Caraccas. In the rich black mould of the plains the prairie-grass finds its appropriate nourishment to the exclusion of other forms of vegetation; but this in its turn is supplanted by many of the tame grasses. On the other hand, the yellow soil along the ravines and alluvial bottoms gives sustenance to a growth of trees, the commonest of which are burr, jack and white oak, hickory, black walnut, linden and beech. The black-prairie soil contains a large amount of organic matter, and is admirably adapted to the cultivation of corn. Repeated crops may be taken from it without requiring the application of manures. In fertility it is unsurpassed, and ere long these prairies will prove the granaries of the United States. Those portions which are destitute of this black-mould covering are well adapted to the growth of wheat.

There is no better wheat region in the West, than the northern and southern portions of Illinois. The soil contains less organic matter than that of the interior, and perhaps a larger admixture of calcareous materials. The Drift in the northern part is made up of coarse materials, which admit of ready drainage; while in the southern part,

along the valleys of the principal
ancient terraces, stratified beds of sand
known as Valley Drift. Deposits of
valleys of the Illinois, the Wabash,
their southern limit is about latit
materials are of great economical valu
and while the northern portion of the
in considerable abundance, the soutl
tute.

## GEOLOGY.

The Illinois Central railroad passes
tems of rocks which are included betwe
and Upper Carboniferous. For more t
distance, the underlying rocks consist
and limestones, belonging to the Coal
they constitute an unbroken assembl
towards a common centre, or are arra
lachian coal-field in a series of undu
yet to be solved. The idea has beer
explorers that the productive coal-s
basins of limited extent, which are no
temporaneous origin. To these viev
The continuity of the coal has been
instances to be interrupted by the int
rocks ; but if we were to suppose that t
had been at one time arranged in a s
or waves, and that their crests had su
ed so as to expose the subjacent rock
all the phenomena which it is now so
resort to limited basins and local upl

to the Road, may be arranged for convenience of description in three groups, in the ascending order, thus :

| | |
|---|---|
| Group I. | Alternations of blue compact limestone containing the fossil, *Archimedes*.<br>Black slates.<br>Fine-grained sandstones, with traces of hydrated brown iron-ores: also, a belt of white öolitic limestone. |
| Group II. | Conglomerate (pebbles rare and small).<br>Millstone and grindstone grits.<br>Sandstones, grey, yellow and red. |
| Group III. | Alternations of buff and dove-colored shales, with vegetable impressions.<br>Fire-clays, impure limestones.<br>Sandstones with seams of coal, and traces of carbonate of iron. |

The relations of these groups will be more clearly understood by reference to the section appended to this report.

*Limestones.*—Commencing at the terminus of the road at Cairo, and proceeding north to Ullin—a distance of twenty miles—the country is low, flat, and subject to overflow; and the soil consists of the alluvial deposits of the Ohio and Mississippi rivers. Between this station and Union, on the banks of Mill creek, (S's 12 and 14, T. 14, R. 1.) west of the road, the blue limestone rises in cliffs from twenty to sixty feet in height. It is tough and compact, and can be quarried in blocks of any size.* This rock is exposed at short intervals along the road, above Jonesboro', to the southern limit of Town 11. It is somewhat variable in character, some portions weather admirably, while others crumble. It quarries readily in cuboidal blocks, with good natural faces, and will prove a valuable material for building, pav-

* For very many of the local details relating to this portion of the state I am indebted to Col. L. W. Ashley who for many years was the engineer in charge of this division of the Road.

while the superior portions present sharp and well-defined outlines. Thin seams of coal are intercalated with the sandstones, but they are of no economical value. Some of the sandstones exhibit vegetable markings, among which I recognized the *Lepidodendron aculeatum*. Four miles above this station, a valuable quarry has been opened which is connected with the track by a switch. The layers are variously tinged buff, yellow and red. The grains are sharp and united by no visible cement. The rock when first extracted yields readily to the chisel, but hardens on exposure.

The red sandstone has all the beauty of the Portland freestone of the Connecticut valley, while in durability it surpasses it. These deposits will furnish an inexhaustible supply of stone for ashlers, underpinnings, caps, lintels, &c., and at a cheaper rate than the cost of limestone. The purer portions will probably be found to answer for fire-stones. Altogether, I regard this as the best and cheapest material for construction that I have seen in the state.

The geological position of this group is at the base of the Coal Measures.

*Coal.*—After passing Makanda, we enter on the southern borders of the Coal Measures. On the Big Muddy river, at Murpheysboro', six miles west of the Road, and at other points, coal is extensively mined, and conveyed down the stream during the spring freshets in barges, and sold to the steamboats, or sent to the St. Louis market. It is of an excellent quality and sufficiently firm to bear repeated handling. There are two beds, about three feet each in thickness, separated by a thin parting of shale. Near Carbondale on the line of the Road, there is a seam nearly two feet in thickness, and of a good quality ; and at Bainbridge, ten miles east, there is a seam said to be seven feet thick.

The boring at De Soto disclosed the existence of five dis-

tinct seams in a space of six hundred feet. The following is extracted from the record:

| | | | | | | |
|---|---|---|---|---|---|---|
| Bed No. | 1. | Thickness | 3 | feet. | Depth below surface | 68 ft. |
| " | 2. | " | 2 | " | " " | 93 |
| " | 3. | " | 9 | " | " " | 135 |
| " | 4. | " | 2 | " | " " | 165 |
| " | 5. | " | 9 | (coal and shale) | " | 216 |

Specimens of the coal chippings should have been kept for analysis to determine their purity.

*Du Quoin Coal.*—A thick seam of coal is exposed in a ravine, a mile and one-half north of Du Quoin. Col. Ashley has penetrated to it by a sloping shaft, near the railroad, and is now working it successfully. The coal here lies about seventy feet below the surface. The following is a section of the strata passed through in sinking the shaft:

| | | |
|---|---|---|
| No. 1, | Yellow clay, | 18 feet. |
| 2, | Clean sand, | 6 |
| 3, | Blue clay, | 6 |
| 4, | Shale, | 10 |
| 5, | Drab-colored limestone, | 3.75 |
| 6, | Shale (fire clay), | 6 |
| 7, | Light-colored shale, | 1.75 |
| 8, | Bluish impure limestone, | 2.80 |
| 9, | Bituminous shale, | 6 |
| 10, | Light-colored shale, | 10 |
| 11, | Bituminous coal, | 6.50 |
| 12, | Fire clay, | 3 |
| 13, | Limestone, | 3 |
| 14, | Soft shale, | |
| | | 82.80 |

The average thickness of the seam, as exposed in the workings, is six feet ten inches. The roof is composed of dark shale which contains numerous vegetable markings, among which I observed *Pecoptera*, *Asterophyllites*, and the decorticated trunks of *Sigillariæ* of gigantic size. The dip

of the strata is S. 10° W., at the rate of forty feet per mile, a deviation from the general strike of the strata in the southern part of the state. The seam presents a remarkable uniformity in quality throughout,—the upper portion being apparently as pure as the lower. The coal, on cross fracture, is of a glossy jet-black, does not soil the fingers, breaks in cuboidal blocks, and is thoroughly compacted. Along the lines of lamination, traces of mineral charcoal are apparent. It ignites rapidly, does not agglutinate, but preserves its form, yields a small amount of ash, and does not clinker. Seven bushels of it, after combustion in an ordinary stove, yielded only seven pounds of ash. In its chemical composition, it is found to consist of 7 per cent. of water; 28.20 of volatile matter; 61.20 of fixed carbon; and 3.20 of ash ; closely resembling the Brier Hill coal of Ohio, and the Ormsby coal of Pennsylvania, which hold the highest rank for steaming purposes of any in the Chicago market. It is now successfully coked in ovens near the mine. The coke exhibits a grey metallic lustre, with a cellular texture. This coal belongs to the variety known as *Splint;* and though less productive in volatile gases than some of the soft fat coals, it is successfully employed for the generation of burning gas at Dubuque.

This seam exhibits some traces of sulphuret of iron, but for the most part, it is concentrated in layers, which are readily assorted. In the joints are found traces of calc-spar. This coal has many properties which place it in the front rank of western coals,—freedom from sulphur, a substance deleterious to gas, and which rapidly corrodes the flues of boilers,—cleanliness when employed as a domestic fuel,—firmness to bear distant transportation without *slacking*,—retention of form during combustion by which the air may permeate freely through the interstices,—absence of clinker, which obstructs the bars of the grate and causes them to burn out,—and readiness in coking, yielding a large per centage of fixed carbon. In its crude state it may be employed in driving the locomotives of freight trains, while the coke may be employed on passenger trains,—a

result already contemplated by the agents of the Company, when the wood along the line shall have been consumed.

At present there are forty miners employed, each one of whom ought to take down 100 bushels per day, making the aggregate of their stoping 50,000 tons per annum. This is about one-half of the annual demand at Cairo, and about one-half of what will be required along the Road for local consumption. From this source alone the Railroad ought to derive a traffic which shall yield them nearly $200,000 per annum. The price of coal by the quantity at the mouth of the pit is $1 50 per ton, and the cost of transportation for long distances 1¾ cents per ton per mile. The prime cost of this coal delivered at Chicago would be about $6.50 per ton, where it will successfully compete with the best coals of Pennsylvania and Ohio, which are now brought to that market.

Under the management of Capt. Jack, the mine has been judiciously opened, and the workings are prosecuted with energy and skill. A stationary steam-engine frees the mine from water and draws the laden cars up an inclined plane, on to a platform, whence the coal is transferred to the freight cars.

At Centralia, sandstone is observed which contains the leaves of *Palmaciteæ*, characteristic of the Carboniferous flora. It is rather inferior for construction, although employed in culverts and foundations. Here the strata have been perforated to the depth of over 600 feet through the Coal Measures. At the depth of 225 feet a seam of coal, six feet in thickness, was struck, surmounted by a bed of limestone, seven feet in thickness. At the depth of 328.6 another bed of coal was intersected, three feet in thickness. After passing the sandstone near the surface, the course of the auger was through shale-beds, interstratified with three thin belts of limestone.

At Pana there is evidence of the existence of coal-bearing rocks. In the banks of Coal run, three miles east, a thin seam is observed, overlaid by heavy masses of shale. This coal has long been procured for local use by stripping, and

sult in the development of a good workable seam.

When we consider the increasing demand for this kind of fuel, and the facilities which exist at this point for its transportation, it is a matter of surprise that the owners of the land should have remained contented with such superficial explorations.

*Danville Coal.*—In the bluffs of the Vermillion, at Danville, three seams of coal are observed. The first or upper seam appears near the top of the plateau, on which the town is built, and is six feet in thickness. Next succeeds a bed of shale three feet, reposing on another seam of coal twenty inches in thickness. The lower seam is three feet thick. I saw this bed at one point only, and am unable to state the width of the intervening space, or the character of the strata, except that there is interposed a band of limestone four feet in thickness. The six feet seam, however, is the one which will prove of the most economical value. The roof is shale, which is somewhat fragile. This coal, as compared with that of De Quoin, is less brilliant and firm—being almost too brittle to bear distant transportation—and contains more sulphur, while the joints show traces of calc-spar. It is, however, a strong and valuable coal which does not agglutinate in burning. It contains more than one-half of its weight in fixed carbon, and yields an inconsiderable amount of ash.

The strata here dip to the southward at the rate of about 50 feet to the mile, although subject to irregularities. In following up the Salt fork of the Vermillion, this coal is exposed at numerous points in its banks, and is mined by stripping, for local use. It is here so much weathered and discolored by oxide of iron, as to conceal its true characters. Dr. Fithian has intersected this coal twelve feet below the surface, on Sec. 32, T. 19, R. 13., but has not determined its thickness. This point is about a mile north

of the Great Western railroad, and about eighteen miles east of the Chicago branch of the Illinois Central. Evidences of the existence of this seam have also been observed on the Lander farm, four miles farther west, approaching within fourteen miles of Urbanna. Unless the continuity of the strata is interrupted, of which the configuration of the country affords no evidence, there is a strong probability that the six-feet seam may be struck at an inconsiderable depth to the north of Urbanna, in the vicinity of Pera or Rantoul; and I recommend to the agents of the company to institute borings at those points. If this seam is struck at a great depth at any given point, so that the cost of lifting to the surface would become expensive, it would be advisable to search for it farther to the northward, since the strata rise in that direction.

The opening of the Great Western road will render the Danville deposits tributary to the Chicago branch of the Illinois Central, and the city of Chicago will become its appropriate market. The prime cost of this coal delivered there would be about $4.50 per ton. If this seam can be intersected on the Chicago branch, the cost need not exceed $3.60 per ton.

Should these experiments prove abortive, still I regard this seam, as at present developed, of great economical value, and as forming an important adjunct to the Chicago branch. In another part of this report I have adverted to the character of the country along its route. Although the soil is of unsurpassed fertility, yet the tide of settlement has been diverted from this region in consequence of the scarcity of timber. When the fact becomes thoroughly understood that Chicago is one of the best lumber marts in the United States, and that fuel can be delivered at every man's door as cheaply as though his house was in the midst of a forest, these lands will be eagerly sought for. The cost of clearing wooded lands is from $8.00 to $10.00 per acre, and years must elapse before the stumps disappear from the fields ; but the prairies are already prepared for cultivation, and, the first season, yield a remunera-

amount of heat than a cord of wood, and can be delivered at any point on the Chicago branch at a cost of $1.50, if found on the line; or $2.00 if brought from the valley of the Vermillion. Thus the fuel for a family in ordinary circumstances, in the prairie region, need not exceed $30 per annum.

**Geological Structure of the Northern Division.**

*La Salle Coal-Field.*—(Vide Section appended to Report.)

The northern margin of this coal field extends but a few miles north of the Chicago and Rock Island road, the intermediate space between its out-crop and Galena being occupied by groups of strata below the Carboniferous. Of these groups, the Galena limestone (belonging to the Lower Silurian system, which is the chief repository of the lead ore of northern Illinois), is of the greatest economical value. I have not passed over the Galena branch of the Road, and have no definite information to convey as to the extent of its developement along the route. The products of the mines of the Upper Mississippi, a portion of which is conveyed over the Central road, have amounted for a series of years, to nearly a million and a half dollars per annum.

To this series, also, belongs the buff-colored magnesian limestone, quarried at Athens, and so extensively used for construction at Chicago. It is close-grained, compact in its texture, works easily under the chisel into any form, and is but a little more expensive than brick. It comes out in layers, whose under surfaces are covered with water-marks. The subjoined analysis indicates that it is a double compound of carbonate of magnesia and carbonate of lime, in lnearly atomic proportions. Those rocks which contain a arge number of ingredients not chemically combined, are

apt to crumble; but this objection does not apply in this case. So far as I can judge, it withstands very well the vicissitudes of freezing and thawing.

ANALYSIS OF THE ATHENS LIMESTONE.—*Blaney.*

| | |
|---|---|
| Silex and Clay, | 17.33. |
| Alumina, | 1.33. |
| Peroxide of Iron, | 0.59. |
| Lime, | 20.00. |
| Magnesia, | 19.66. |
| Carbonic Acid, | 42.66. |
| Water, trace, | |
| | 101.00. |

At La Salle I had the pleasure of meeting Dr. Norwood, the State Geologist of Illinois, who kindly accompanied me to different localities, and pointed out to me the most striking features in the geology of this region. And, in attempting to sketch the peculiarities of this coal-field, I wish it to be distinctly understood that I but describe phenomena which he was the first to observe, and the details of which he will doubtless fully elaborate in his Final Report. He has here discovered one of the most interesting facts in the history of the Carboniferous period of America, *i. e. The existence of the coal-seams upon the upturned strata of the Lower Silurian series.*

In visiting the Split Rock, about two and one-half miles east of La Salle, the geologist is utterly amazed to observe a coal-seam with a thin intervention of shale, and this at times is wanting, reposing unconformably upon strata which contain fossils belonging to some of the earliest forms of organic life. That vast series of rocks so conspiciously displayed in New-York and Pennsylvania, interposed between the Lower Silurian and the productive Coal Measures, as well as the Carboniferous limestones and sandstones which form so prominent a feature in the geology of southern Illinois, are here entirely wanting. This hiatus embraces many thousand feet in vertical thickness ;

supposition of a powerful denudation prior to the deposition of the coal.

The sandstone, which here crops out in bold precipitous scarps, and which the geologist would, at the first glance, place at the base of the Coal Measures, is surmounted by limestone containing fossils characteristic of the Trenton group, and reposes upon a magnesian limestone which contains some of the earliest types of animal life.

This sandstone, which is about 100 feet thick, is by no means homogeneous in character. At the Railroad tunnel, some of the layers have disintegrated into a pure white silicious sand, suitable for glass manufacture, and others contain large angular fragments and rounded pebbles of pre-existing rocks.

The limestone reposing upon it, according to Dr. Norwood's measurement, is about 250 feet thick, and affords nothing of economical value.

The inferior limestone is highly magnesian in its composition, and includes two bands of cement, each of which is about six feet in thickness. A few miles east, this substance is quarried in the Illinois bottom, and calcined into hydraulic lime. The following is its composition, according to the analysis of Dr. Blaney:

| | |
|---|---|
| Carbonate of Lime, | 43.50 |
| Carbonate of Magnesia, | 30.07 |
| Carbonate of Iron, | 2.00 |
| Clay, | 20.00 |
| Silica, | 1.00 |
| Alumina, (trace,) | 0.00 |
| Potash, | 0.18 |
| Water, | 3.00 |
| Loss, | 0.75 |
| | 100.00 |

The superior limestone, the sandstone, and the inferior limestone, compose the subordinate group which, before the deposition of the coal, appears to have been thrown into a wave-like flexure, with the crest to the west. Subsequently the whole experienced an elevatory movement, by which they were made to assume their present position. This axis of elevation, as determined by Dr. Norwood, bears N. 30° W.; and while on the western side the strata dip from it at the rate of 18°, the dip on the eastern is but 8°. The summit of the arch occurs at the mouth of Consaugan creek; but here only the lower limestone is visible,—the two superior members having been swept away. It is not improbable that, in the formation of the original flexure, a fissure was created along the line of greatest tension, through which the stream now finds its way to the Illinois river.

The coal-field of La Salle occupies the trough-like depression thus created. The lowest seam sometimes reposes immediately upon the basset edges of the older rocks, and at other times is found to have a parting of shale. Its thickness is from 3.6 to 4 feet. Between the lower seam and the middle one, there is an interval of 176 feet, composed of alternations of shale and limestone, with thin bands of sandstone. The middle seam is 6 feet in thickness; the upper part for the distance of a foot or fifteen inches, consisting of an impure slaty cannel. The upper seam occurs 53 feet above, and is nearly four feet thick. The interval between consists of alternations of shale and limestone, with a belt of sandstone 20 feet in thickness. The superincumbent strata do not differ essentially from those which occur below. There is one striking feature about this assemblage of strata, that while in most coal regions, sandstones constitute the predominant rocks, here their place is supplied by limestones.

The coal-seams dip to the southwest, at a rate intermediate between 5° and 10°. The mines are on the right bank of the canal, and adjacent to the track of the Chicago and Rock Island railroad. There are also several open-

debted for many of the foregoing details, furnished me with records of numerous borings which have been made to intersect these seams at other points; and although of much practical interest, I shall omit them in this report. They clearly show that the coal-seams sink deeper as they recede to the southwest, and emerge to the surface as they advance to the northeast.

"These beds," remarks Mr. Campbell,* "all re-appear in the bluffs of Big Vermillion, on the south side of the Illinois river, where they are thicker than on the north side; the lower bed here being four feet thick; and some fifteen or eighteen miles up the stream the middle bed is found eight feet thick, and of good quality. The coal is found all along the Big Vermillion, from its mouth near La Salle, to the southern boundary of the county. It also extends into the northwestern part of Livingston county, and from the extent of this outcrop, as well as from examination by boring, it is found to underlie a large area of country." The Kentucky Mining Company are sinking a shaft north of the town contiguous to the Central railroad, and will raise the coal and deliver it on the track by means of a stationary engine.

At La Salle, the track of the Central Road is carried over the Illinois valley by a magnificent viaduct 2000 feet in length, and 80 feet above the bed of the stream. The bluffs rise to the height of upwards of 200 feet, affording admirable sections of the rocks above the coal-seams. These consist of bands of limestone, which affords a durable and handsome material for construction, and beds of greenish, reddish and dark colored shales.

From the prevalent dip of this series, the coal ought to be found emerging to the surface on the line of the Chicago branch north of La Salle, and under circumstances favorable to mining.

* Glance at Illinois, p. 19, 20.

Passing eastward from the Split Rock, the axis of old Silurian strata is found to occupy a belt three or four miles in width, flanked by the coal-bearing rocks of Marseilles and Ottowa, with a reversed dip from those of La Salle. The lower seam is mined to a considerable extent. At Morris, it is obtained on the prairie, by stripping, and also by drifting. The field is of limited area, and appears to be but an outlier of the great mass. The sandstone ridge, as far as traced, interrupts the continuity of the strata, and completely separates the two fields. East of Morris, an undulation occurs, bringing up the older rocks, which continue thence to Chicago.

The axis of elevation, which I have described, ought to carry the coal of the eastern slope across the Chicago branch, in the direction of the Kankakee river, and it may turn out that its valley is a synclinal trough which has been determined by it. It is not impossible, however, that another agency may have modified its boundaries, that is the Drift. How extensively it may have broken up and ground down the subjacent strata, and covered the surface with transported materials, I am not prepared to say. We know that these accumulations in places are two hundred feet in thickness; but at Rantoul the underlying rocks approach near the surface. Here, a limestone is quarried on the prairie and burned into lime. When I visited the locality, the pit was full of ice and snow; but, from an inspection of hand-specimens, I found that it differed lithologically from the old Silurian limestones which I have before described. It is, too, fossiliferous. I obtained a single specimen of a crinoid, which is very much like one which occurs in the true Carboniferous. If, on the opening of spring, this deposit should be uncovered, so as to reveal a few of the fossils, the question could be determined beyond a doubt. Theoretically, both the La Salle seams and those of Danville ought to be found on the Chicago branch. The latter I regard as higher in the series, and entirely distinct. The buff limestone of Kankakee is below all the coal.

*La Salle Coals.*—The coals of La Salle belong to the

lime, which is undoubtedly a secondary product.

The following analyses of them were made by Dr. Blancy:

| *Rockwell Mine.* | *Uncombined Water.* | *Volatile Matter.* | *Fixed Carbon.* | *Ash.* |
|---|---|---|---|---|
| Upper, | 12·00 | 25 00 | 60 00 | 3·00 |
| Middle, | 12 00 | 29 00 | 54·00 | 5·00 |
| Lower, | 10·40 | 26 60 | 48 60 | 11 40 |

It will be seen that these coals contain a fair amount of fixed carbon, and that, with the exception of the lower seam, the earthy matters are not in excess. The amount of water is large, which causes them to decrepitate in burning. The presence of sulphur is sufficiently large, particularly in the lower seam, to unfit them for gas or steam purposes, and the presence of sulphate of lime causes them to slack. They do not rank with those from Du Quoin or Danville.

Mr. Lathrop informed me that Messrs. Field & Round were now mining from the lower seam, 400 tons per week, and that the other companies were taking out a like amount, or rather more; making the weekly product about 1000 tons. Miners take down about a ton per day. In the upper seam, they are allowed four and a half cents per bushel; in the lower, five cents. The price of coals at the mines is $2.25 per ton.

The demand for this coal is quite brisk, and the traffic to the road derived from this source is very considerable. Mr. Campbell, a judicious observer, residing on the ground, remarks: "This being the most northern workable deposit of coal found in the state, and there being but little timber, either in northern Illinois or southern Wisconsin, it is apparent that the consumption of this kind of fuel must of necessity become very great in that section of country; and that they will naturally depend on these mines for a supply. Besides supplying the cities of La Salle and Peru, it is shipped in large quantities to all points on the Galena branch of the Illinois Central railroad, as far north as Dunleith, on the Mississippi river."

There are already known, adjacent to the road, three centres of distribution, where coal exists in exhaustless quantities, and can be mined under the most favorable circumstances. If from these centres we describe circles with a radius of one hundred miles, we shall find that they nearly inosculate, and bring within their lines the extremities of the state. When the facilities for production and distribution are fully systematized, cheap fuel will be at the command of every one; and undoubtedly each year will reveal new sources of supply.

The nearest coals to Cleveland are forty miles distant, while a very considerable portion of them are transported one hundred miles. They are then shipped eight hundred or a thousand miles to the Chicago market, where they enjoy almost a monopoly. They are not essentially better than the coals of southern and central Illinois; but, at *present*, they occur under circumstances more favorable to mining and transportation.

In the subjoined table I have instituted a comparison between the coals of the two regions, which may be advantageously consulted by all interested in the production, distribution, or consumption of this important article.

The Ormsby and Brier Hill coals are the best and most economical for use, now brought to the Chicago market, containing the largest amount of fixed carbon and the least amount of earthy impurities. The Du Quoin is equally good, while the Danville ranks a shade lower; but is quite equal to the Chippewa or Diamond Hill. The Morris and Ottawa coals must be assigned to the third rank. The large amount of water existing in the *clum* as moisture causes them to snap in burning, and requires a portion of the carbon to be consumed to extract it. The prevalence of sulphur, too, impairs their value for steaming purposes, while the presence of sulphate of lime in the joints causes them to exfoliate rapidly, when exposed for a short time to atmospheric agents.

The above table shows that the Illinois coal-field furnishes just as good coals as those from Ohio and Pennsylvania.

## Comparison between the Coals of the Illinois Coal-field and those of the Appal

## Coal-field, brought to the Chicago Market.

| Designation. | Distance from Chicago. | Thickness of Seam. | | Specific Gravity. | Fixed Carbon. | Hygrom. Moisture. | Volatile Matter. | Ash. | Ch |
|---|---|---|---|---|---|---|---|---|---|
| **ILLINOIS.** | Miles. | Feet. | Inches. | | | | | | |
| DU QUOIN, | 284 | 6 | 10 | | 61.20 | 7.00 | 28.60 | 3.20 | Bla |
| MURPHYSBORO', | 290 | 3 | 06 | 1,352 | 57.30 | 38.20 | | 4.50 | Still |
| DANVILLE, (Upper,) | 170 | 6 | | | 53.40 | 43.20 | | 3.40 | Bla |
| " (Middle.) | " | | | | 56.80 | 44.40 | | 2.80 | |
| " (Lower,) | " | | | | 55.60 | 33.20 | | 11.20 | |
| " (Average.) | | | | | 57.90 | 7.60 | 29.50 | 3.50 | |
| ANVIL ROCK, (Upper,) | | 4 | | 1,273 | 54.45 | 2.00 | 32.55 | 11.00 | Ow |
| " " (Middle.) | | 3 | 04 | 1,478 | 54 40 | 3.00 | 33.60 | 9 00 | " |
| " " (Main.) | | 5 | 04 | 1.255 | 59.50 | 2.00 | 36.00 | 2.50 | " |
| " " (Little,) | | 3 | | 1,309 | 60.40 | 2.00 | 33.60 | 4.00 | " |
| MORRIS, | 60 | | | | 57,20 | 11.00 | 23 80 | 8.00 | Bla |
| " | " | | | | 57.40 | 10.40 | 23.00 | 9.20 | |
| LITTLE ROCK, | 100 | | | | 54.40 | 8.60 | 32 50 | 4.18 | |
| LA SALLE, (Upper,) | 93 | 4 | | | 60.00 | 12.00 | 25.00 | 3.00 | |
| " (Middle.) | " | 5 | | | 54 00 | 12.00 | 29.00 | 5.00 | |
| " (Lower,) | From CLEVELAND, | 3 | 06 | | 48.60 | 10.40 | 29.60 | 11.40 | |
| **OHIO.** | | | | | | | | | |
| HAMMONDSVILLE, | 100 | 4 | | 1,335 | 51,08 | 46.44 | | 2.47 | Nev |
| " | " | | | | 65.60 | 29.20 | | 5.20 | Bla |
| McINTOSH, | 100 | 2 | 06 | 1,269 | 44.87 | 38.73 | | 16.39 | Nev |
| BRIER HILL, | 80 | 4 | 06 | 1,269 | 61.24 | 35 96 | | 2.79 | |
| TALLMADGE, | 40 | 4 | 06 | 1,264 | 53,40 | 44.29 | | 2.28 | Mat |
| CHIPPEWA, | 50 | 4 | 06 | 1,264 | 54.05 | 42.89 | | 3.06 | Nev |
| BOLIVAR, | 75 | | | 1,283 | 50.22 | 47.04 | | 2.73 | |
| **PENNSYLVANIA.** | | | | | | | | | |
| PITTSBURG, | 101 | 6 | | 1,252 | 44.93 | 36.76 | | 7.07 | Joh |
| ORMSBY, | | | | | 64 40 | 33.20 | | 2.40 | Bla |
| DARLINGTON, | 102 | 10 | | 1,488 | 17.27 | 34.72 | | 48.00 | Nev |

)u Quoin the cost is as follows:

| | | |
|---|---|---|
| r's wages, 2½ cents per bushel. | 70 per ton. | |
| lty, - - - - - - | 28 | |
| de expenses, say, - - | 25 | |
| per ton of 28 bushels delivered at the mouth of mine, | | $1 23 |
| . Salle. Miner's wages, 05. | 1 40 | |
| lty, - - - - - - | 28 | |
| de expenses, - - - | 25 | |
| | | $1 93 |

Quoin, I was informed that a good miner would and deliver 100 bushels per day, and at La Salle ining of 50 bushels was considered a good day's

where the seam is four, or four and one-half feet iner will average nearly 100 bushels per day. he Tallmadge mines, two years ago, I procured ng statistics as to the cost of mining. The miners' aken at random from the time book:

| | E. T. | bush. | J. P. P. | bush. | J. D. | bush. |
|---|---|---|---|---|---|---|
| 5 | 1st day, | 122 | 1st day, | 101 | 1st day, | 22 |
| 8 | 2d day, | 84 | 2d day, | 88 | 2d day, | 84 |
| 4 | 3d day, | 144 | 3d day, | 40 | 3d day, | 54 |
| 0 | 4th day, | 108 | 4th day, | 160 | 4th day, | 108 |
| 6 | 5th day, | 96 | 5th day, | 96 | 5th day, | 90 |
| 3 | | 534 | | 485 | | 408 |

)uld give an average to each man of more than per day, at a daily rate of $1.35.

there of raising a ton of coal was as follows:

| | |
|---|---|
| 's wages, 1½ cents per bushel. | $0.42 p.ton |
| ty, - - - - - - - | 0.23 |
| le expenses, including timbering, ling the coal, &c., | 0.25 |
| | $0.95 |

*Cost of Transportation.*—The rates of freight on the Illinois Central railroad, vary between five cents per ton, per mile, for short distances, and 1¾ cents for the longest. I presume that the managers of other Roads have adopted substantially the same tariff. The Ohio Roads, two years ago, were transporting coals from the Ohio river to Cleveland, at the rate of one and one-fourth cents per ton per mile; but we presume that the agents will find it necessary to raise their tariff to the standard of Illinois. The cost of transportation on the Ohio Canal, was ranged from one and three-fourths, to two cents per ton per mile, which is probably as cheap as railroad transportation. The lake transportation, from 700 to 1000 miles, effected during the summer when freights are dull, costs from $1.75 to $2.00 per ton.

Let us reduce these facts to practical economy.

| | | |
|---|---|---|
| The prime cost of Ohio-river coal, is, say, per ton, - - - - - - - - | 0 95 | |
| Railroad transportation to Cleveland, - | 1 75 | |
| Wharfage, - - - - - - | 0 25 | |
| Lake freight, - - - - - - | 2 00 | |
| Cost delivered at Chicago, - - - | $4 95 | |
| The prime cost of the Du Quoin coal is, per ton, - - - - - - - - | 1 23 | |
| Railroad transp'tion to Chicago, 284 miles, | 5 00 | |
| | | $6 23 |
| The prime cost of La Salle coal is, - | 1 93 | |
| Railroad transportation, 93 miles, assumed at two cents per ton, per mile, - - - | 1 86 | |
| | | $3 97 |

These estimates are based on the supposition of a limited business, and the existing relations of affairs; but should

the demand become sufficiently great to require a train to be devoted exclusively to this kind of transportation, it is probable that the Company would be able to modify materially their tariff.

The peculiarities of La Salle coal, which we have indicated, will preclude it from maintaining a successful competition with the Ohio coals, in the Chicago market, for the purposes of steaming and manufacturing. In the region to the north, embracing northern Illinois and southern Wisconsin, it will enjoy an unlimited demand for domestic purposes; and in its transportation, the Galena branch will command a monopoly.

If the Danville coals, on the completion of the Western railroad, were mined as cheaply as those of the Ohio river, the cost would be as follows:

| | |
|---|---|
| Mining, &c., - - - - - - | $0 96 |
| Railroad transportation, 170 miles, - - | 3 00 |
| Cost at Chicago, - - - - - | $3 96 |

It has been estimated that Illinois contains a larger amount of available coal than any other state. Without fully subscribing to this opinion, I am prepared to say that there is an ample store of fossil fuel within the state, at accessible points, and which can be mined at economical rates for all coming time.

The consumption of coal at Chicago during the past year was upwards of 100,000 tons, and ten-elevenths of this amount was furnished by other states; and this will continue to be the case until new sources of supply are opened, and the cost of mining undergoes a marked reduction. This fact may seem surprising to those who are unacquainted with the local circumstances of the case. Within my recollection, flour was imported into Chicago, which has now become the grain-market of the world. A few years ago only, Iowa consumed all of her wheat; and thirty years ago, the surplus products of Ohio were quite inconsiderable. In the first settlement of a country all kinds of labor command the highest price, and the products of the soil raised

by the actual settler are required to supply the wants of the immigrant.

The pioneers cluster around the groves from which they derive their supplies of fuel and timber. It is not until men congregate in towns and engage in mechanical pursuits, as a means of support, that the necessity becomes apparent of resorting to a cheaper and better fuel beneath the surface. Then succeeds systematic mining, then are opened new avenues of transportation, then are introduced mechanical contrivances to supplant the labor of human muscles. Illinois has just entered on this phase of her destiny.

The history of the coal-trade of Cleveland is at once interesting and instructive. At the time of the opening of the Canal, in 1830, the quantity received at that port was less than 200 tons. In 1840, the yearly receipts were only 6000 tons; while at this time they do not fall below 250,000 tons. There is no doubt that this trade is one of the principle sources of her prosperity.

The great obstacle to the growth of Chicago, as a seat of manufacturing industry, is the high price of fuel. The difference in the cost of this item between Chicago and Pittsburgh as estimated by Dr. Blaney, amounts to 16 per cent. in favor of the latter, and between Chicago and Cleveland to nearly nine per cent. The developement of the Danville coal region, and a reduction of the cost of mining and transportation to the standard of Ohio and Pennsylvania, would go far to equalize the difference in the price of coals which now prevails between Cleveland and Chicago.

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Note.—It is a singular historical fact, that the indication of coal near the present town of Ottawa, on the map of Father Hennepin, published in 1679, is the earliest notice we have of the existence of this valuable combustible in America! This was nearly a century before its discovery in Pennsylvania. In 1763, Col. Croghan was taken captive by the Indians, and carried into the Illinois country. In his journal he says: "On the south side of the Ouabache (Wabash), was a high bank, in which are several fine coal mines." Five years subsequently, (1768), its existence became known in Pennsylvania. *Taylor's Statistics of Coal*, pp 21, 22. The latter deposits are yielding a yearly product of nearly 5,000 000 of tons, while the former have remained comparatively undisturbed. But a change is at hand.

To supply the demand existing at this point alone would require the labor of one hundred miners, working three hundred days per annum, each taking down 90 bushels per day. It would require, over the Chicago branch, a daily transportation of 9000 bushels, to say nothing of passengers and other descriptions of freight passing to and from the mines. The moment that it can be sold from 25 to 50 cents per ton cheaper than the Ohio coals, that moment there will arise a demand for it in other quarters; thus giving employment to additional miners, and requiring additional facilities for transportation. Thus, to the mining proprietor, will be presented new inducements to increase the supply; and, to the Railroad Company, it will open new sources of revenue. The permanent prosperity of both is to be sought in moderate profits, arising from an extended business, rather than the exorbitant profits of a restricted one.

With the question of cheap fuel is intimately connected the future prosperity of Chicago. The wonderful increase in her population, the rapid growth of the industrial arts, the thousand steamers and propellers that arrive and depart from this port each year, and the hundred railroad trains that arrive and depart each day,—all of these create a demand for this combustible, which will increase in a ratio of which our experience of the past affords a very inadequate guide for the future.

I have thus endeavored to embody the results of my hasty observations in an intelligible form. If my time had been less restricted, and the season more propitious, I might have solved some problems with regard to the geology of the state, which I leave in doubt.

Illinois is among the most favored of states;—in geographical position, in climate, in fertility of soil, in mineral resources, and in facilities for intercommunication. During the past month, I have travelled more than a thousand miles within her borders, without having seen hardly an acre of sterile, or irreclaimable land. The greater portion of her territory is in a state of nature. Here and there only has the plow turned up the sod to the light of the sun, or the

miner's pick revealed the treasure hidden beneath. Her population is sparse, but immigration is now setting in this direction at the rate of nearly 200,000 souls a year. Her capacity for production is unbounded, and her present means for transportation will soon be tasked to the utmost to convey her surplus products to market.

In that work I fully believe The Illinois Central Railroad is destined to have an ample share.

I am, Sir, with great respect,

Your obedient Servant,

J. W. FOSTER.

*Chicago, March* 4, 1856.

HARRIET MONROE

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